

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
REQUEST FOR FILING NATIONAL PHASE OF
PCT APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.494 OR 1.495

00909

Atty Dkt: P 290694 /2990548US/Ä/kop
M# /Client Ref.

Date: March 6, 2002

1. International Application	2. International Filing Date	3. Earliest Priority Date Claimed
<u>PCT/FI00/00815</u>	<u>22 September 2000</u>	<u>24 September 1999</u>
<u>↑ country code</u>	Day <u>MONTH</u> Year	Day <u>MONTH</u> Year (use item 2 if no earlier priority)
4. Measured from the earliest priority date in item 3, this PCT/USA National Phase Application Request is being filed within:		

(c) Therefore, the due date (unextendable) is March 24, 2002

6. Inventor(s) EIKKULA

7. ☒ Please immediately start national examination procedures (35 U.S.C. 371 (f)).

8. ☒ **A copy of the International Application** as filed (35 U.S.C. 371(c)(2)) is transmitted herewith (file if in English but, if in foreign language, file only if not transmitted to PTO by the International Bureau) including:

- a. ☒ Request;
b. ☒ Abstract;
c. 13 pgs. Spec. and Claims;
d. 2 sheet(s) Drawing which are ☐ informal ☒ formal of size ☒ A4 ☐ 11"

9. ☒ A copy of the International Application has been transmitted by the International Bureau.

10. **A translation of the International Application** into English (35 U.S.C. 371(c)(2))

- A translation of the international application is required by 35 U.S.C. 372(c) and 37 CFR 1.555(a) if the international application is in a language other than English.
- a. ☐ is transmitted herewith including: (1) ☐ Request; (2) ☐ Abstract;
(3) _____ pgs. Spec. and Claims;
(4) _____ sheet(s) Drawing which are:
_____ ☐ informal ☐ formal of size ☐ A4 ☐ 11"
- b. ☒ is not required, as the application was filed in English.
- c. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
- d. ☐ Translation verification attached (not required now).

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11. ☒ Please see the attached Preliminary Amendment
12. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., **before 18th month from first priority date above in item 3, are transmitted herewith (file only if in English) including:**
13. ☒ PCT Article 19 claim amendments (if any) have been transmitted by the International Bureau
14. ☐ Translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., of **claim amendments made before 18th month, is attached (required by 20th month from the date in item 3 if box 4(a) above is X'd, or 30th month if box 4(b) is X'd, or else amendments will be considered canceled).**
15. **A declaration of the inventor (35 U.S.C. 371(c)(4))**
a. ☒ is submitted herewith ☒ Original ☐ Facsimile/Copy
b. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
16. **An International Search Report (ISR):**
a. Was prepared by ☐ European Patent Office ☐ Japanese Patent Office ☒ Other
b. ☒ has been transmitted by the international Bureau to PTO.
c. ☒ copy herewith (2 pg(s).) ☒ plus Annex of family members (1 pg(s).).
17. **International Preliminary Examination Report (IPER):**
a. ☒ has been transmitted (if this letter is filed after 28 months from date in item 3) in English by the International Bureau with Annexes (if any) in original language.
b. ☐ copy herewith in English.
c.1 ☐ IPER Annex(es) in original language ("Annexes" are amendments made to claims/spec/drawings during Examination) including attached amended:
c.2 ☐ Specification/claim pages # ___ claims # ___
Dwg Sheets # ___
d. ☐ Translation of Annex(es) to IPER **(required by 30th month due date, or else annexed amendments will be considered canceled).**
18. **Information Disclosure Statement** including:
a. ☒ Attached Form PTO-1449 listing documents
b. ☒ Attached copies of documents listed on Form PTO-1449
c. ☒ A concise explanation of relevance of ISR references is given in the ISR.
19. ☒ **Assignment** document and Cover Sheet for recording are attached. Please mail the recorded assignment document back to the person whose signature, name and address appear at the end of this letter.
20. ☐ Copy of Power to IA agent.
21. ☐ **Drawings** (complete only if 8d or 10a(4) not completed): ___ sheet(s) per set: ☐ 1 set informal; ☐ Formal of size ☐ A4 ☐ 11"
22. Small Entity Status ☒ is **Not** claimed ☐ is claimed (**pre-filing confirmation required**)
22(a) ___ (No.) Small Entity Statement(s) enclosed (since 9/8/00 Small Entity Statements(s) not essential to make claim)
23. **Priority** is hereby claimed under 35 U.S.C. 119/365 based on the priority claim and the certified copy, both filed in the International Application during the international stage based on the filing in (country) FINLAND of:
- | | <u>Application No.</u> | <u>Filing Date</u> | | <u>Application No.</u> | <u>Filing Date</u> |
|-----|------------------------|--------------------|-----|------------------------|--------------------|
| (1) | 19992054 | September 24, 1999 | (2) | | |
| (3) | | | (4) | | |
| (5) | | | (6) | | |
- a. ☒ See Form PCT/IB/304 sent to US/DO with copy of priority documents. If copy has not been received, please proceed promptly to obtain same from the IB.
b. ☐ Copy of Form PCT/IB/304 attached.

24. Attached:

25 Per Item 17.c2, **cancel original** pages # __, claims # __, Drawing Sheets #26. **Calculation of the U.S. National Fee (35 U.S.C. 371 (c)(1)) and other fees is as follows:**Based on amended claim(s) per above item(s) ☐ 12, ☐ 14, ☐ 17, ☐ 25 (hilit)

Total Effective Claims	27	minus 20 =	7	x \$18/\$9	=	\$126	966/967
Independent Claims	4	minus 3 =	1	x \$84/\$42	=	\$84	964/965
If any proper (ignore improper) Multiple Dependent claim is present,				add \$280/\$140		+280	968/969

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(4)): →→ **BASIC FEE REQUIRED, NOW** →→→→A. If country code letters in item 1 are **not** "US", "BR", "BB", "TT", "MX", "IL", "NZ", "IN" or "ZA"

See item 16 re:

1. Search Report was <u>not</u> prepared by EPO or JPO -----	add \$1,040/\$52	0	960/961
2. Search Report was prepared by EPO or JPO -----	add \$890/\$445	+1040	970/971

SKIP B, C, D AND E UNLESS country code letters in item 1 are "US", "BR", "BB", "TT", "MX", "IL", "NZ", "IN", "ZA", "LC" or "PH"

(X) → <input type="checkbox"/> B. If USPTO did not issue <u>both</u> International Search Report (ISR) and (if box 4(b) above is X'd) the International Examination Report (IPER), -----	add \$1,040/\$52	+0	960/961
(only) (one) → <input type="checkbox"/> C. If USPTO issued ISR but not IPER (or box 4(a) above is X'd), -----	add \$740/\$370	+0	958/959
(these) (4) → <input type="checkbox"/> D. If USPTO issued IPER but IPER Sec. V boxes <u>not</u> all 3 YES, -----	add \$710/\$355	+0	956/957
→ <input type="checkbox"/> E. If international preliminary examination fee was paid to USPTO and Rules 492(a)(4) and 496(b) satisfied (in IPER Sec. V <u>all</u> 3 boxes <u>must</u> be YES for <u>all</u> claims), --	add \$100/\$50	+0	962/963

27. **SUBTOTAL =** \$153028. If Assignment box 19 above is X'd, add Assignment Recording fee of ----\$40 +40 (581)29. If box 15a is x'd, determine whether inventorship on Declaration is different than in international stage. If yes, add (per Rule 497(d)) ----\$130 +0 (098)30. Attached is a check to cover the ----- **TOTAL FEES** \$1570

Our Deposit Account No. 03-3975

Our Order No. 60258 | 029069
C# M#

00909

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 and 492 (missing or insufficient fee only) now or hereafter relative to this application and the resulting Official document under Rule 20, or credit any overpayment, to our Account/Order Nos. shown above for which purpose a duplicate copy of this sheet is attached.

This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal form is filed

Pillsbury Winthrop LLP
Intellectual Property Group

By Atty: Christine H. McCarthyReg. No. 41844Sig: [Signature]Fax: (703) 905-2500
Tel: (703) 905-2143

Atty/Sec: CHM/JRH

NOTE: File in duplicate with 2 postcard receipts (PAT-103) & attachments.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Stage Application of PCT/FI00/00741

EIKKULA

Group Art Unit: Not Yet Assigned

Appln. No. Not Yet Assigned

Examiner: Not Yet Assigned

Filed: March 6, 2002

FOR: CONTROL OF ECHO CANCELLERS IN A TELECOMMUNICATION
SYSTEM

* * * * *

March 6, 2002

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents
Washington, DC 20231

Sir:

Before beginning examination, kindly amend the above-identified application
as follows:

IN THE SPECIFICATION:

On the first page, just after the title, please insert the following paragraph:

--This is a National Stage application of International Application No.

PCT/FI00/00815, which was filed on September 22, 2000, which designated the U.S.,
and was filed in the English language.--

IN THE CLAIMS:

Please amend claims 1-22 as follows:

1. (Amended) A method for controlling echo canceling in a telecommunica-
tions network comprising a first switching center having no echo canceling equipment
and at least one second switching center having echo canceling equipment, said
method comprising a step of

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establishing a call connection which is routed via said first switching center and said at least one second switching center without connecting the echo canceling equipment to the connection,

changing, under control of said first switching center, a configuration of the call connection so that echo canceling becomes necessary,

sending to said at least one second switching center from said first switching center a message commanding said at least one second switching center to connect the echo canceling equipment to the connection.

2. (Amended) A method according to claim 1, wherein said telecommunications network is a mobile communications network, said first switching center is a mobile switching center, and said at least one second switching center is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network, said method further comprising

establishing said call connection initially between a first fixed telephone network party and a second fixed network party through said first mobile switching center and said gateway mobile switching center without any echo canceling equipment being connected to the call connection in said gateway mobile switching center,

releasing a connection leg between said first mobile switching center and the second fixed network party,

establishing, under control of said first mobile switching center, a new connection leg to a mobile station in the mobile communications network so that an end-to-end connection between the first fixed telephone network party and the mobile station is provided through the first and gateway mobile switching centers,

sending to said gateway mobile switching center from said first mobile switching center a message commanding said gateway mobile switching center to connect the echo canceling equipment to the connection.

3. (Amended) A method according to claim 1 or 2, wherein said message bearing an ISUP Facility message provided with a specific field for controlling the connecting of the echo canceling equipment.

4. (Amended) A method according to claim 1 or 2, comprising controlling the call in said first switching center by an intelligent network.

5. (Amended) A method according to claim 4, comprising of performing said release of the connection leg to the second fixed network party and said establishment of the new connection to the mobile station during a call party handling procedure of the intelligent network.

6. (Amended) A method according to claim 2, 3 or 4, wherein said step of releasing the connection leg between said first mobile switching center and the second fixed network party being performed in response to a release initiated by the second fixed network party, preferably a voice mail service.

7. (Amended) A method for controlling echo canceling in a telecommunications network comprising a first switching center having no echo canceling equipment and at least one second switching center having echo canceling equipment, said method comprising a step of

establishing a call connection in a speech mode via said first switching center and said at least one second switching center so that the echo canceling equipment is connected to the connection,

changing, under control of said first switching center, the type of call connection from the speech mode to another transmission mode in which echo canceling is not allowed,

sending to said at least one second switching center from said first switching center a signaling message commanding said second switching center to disconnect the echo canceling equipment from the connection.

8. (Amended) A method according to claim 7, comprising
changing, under control of said first switching center, the type of the call connection from said other transmission mode back to the speech mode,
sending to said at least one second switching center from said first switching center a signaling message commanding said second switching center to connect the echo canceling equipment to the connection.

9. (Amended) A method according to claim 7 or 8, wherein said telecommunications network is a mobile communications network, said first switching center is a mobile switching center, and said at least one second switching center is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network.

10. (Amended) A method according to claim 9, comprising
establishing said call connection between a mobile station and a second fixed network subscriber through said first mobile switching center and said gateway mobile switching center with echo canceling equipment being connected to the call connection in said gateway mobile switching center,

changing, under control of said mobile switching center, the type of call connection from the speech mode to said other transmission mode in which echo canceling is not allowed,

sending to said gateway mobile switching center from said first mobile switching center said signaling message commanding said gateway mobile switching center to disconnect the echo canceling equipment from the connection.

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11. (Amended) A method according to claim 9, comprising
changing, under control of said mobile switching center, the type of the connection from said other transmission mode back to the speech mode,
sending to said gateway mobile switching center from said first mobile switching center said signaling message commanding said gateway mobile switching center to connect the echo canceling equipment to the connection.

12. (Amended) A method according to claim 7 or 8 wherein said other transmission mode is a facsimile mode or a data transmission mode.

13. (Amended) A communications network, comprising a first switching center having no echo canceling equipment and at least one second switching center having echo canceling equipment, said first switching center being configured to be capable of changing the call party during the call by releasing a connection leg to an old party and establishing a new connection leg to a new party, and wherein

the first switching center is configured to send, in response to the change of call party, to said at least one second switching center a signaling message commanding said second switching center to connect the echo canceling equipment to a call connection, when there is no echo canceling equipment already connected to the call connection and echo canceling is required due to the new party.

14. (Amended) A network according to claim 13, wherein said communications network is a mobile communications network, said first switching center is a mobile switching center, and said at least one second switching center is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network.

15. (Amended) A network according to claim 14, wherein said call connection initially comprises a first connection leg from the first mobile switching center via said

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gateway mobile switching center to a first fixed telephone network party, and a second connection leg from the first mobile switching center to a second fixed telephone network party, and wherein the first mobile switching center is configured to release the second connection leg in response to a release message sent by the second fixed telephone network party, and to establish a new connection leg from the first mobile switching center to a mobile subscriber, said new connection requiring echo canceling.

16. (Amended) A network according to claim 14, wherein said call connection initially comprises a first connection leg from the first mobile switching center via said gateway mobile switching center to a first fixed telephone network party, and a second call connection leg from the first mobile switching center via said gateway mobile switching center to a service node, preferably a voice mail service, and that the first mobile switching center is configured to release the second connection leg in response to a release message sent by the service node, and to establish a new connection leg from the first mobile switching center to a mobile subscriber, said new connection requiring echo canceling.

17. (Amended) A network according to claim 13 wherein said message is an ISUP Facility message provided with control information for controlling the connecting of the echo canceling equipment.

18. (Amended) A network according to claim 13, wherein said first switching center is connected to a service control point in an intelligent network.

19. (Amended) A network according to claim 18, wherein said first switching center is configured to perform the change of a call party by a call party handling procedure of the intelligent network.

20. (Amended) A communications network comprising a first switching center having no echo canceling equipment and at least one second switching center having echo canceling equipment, said first switching center being configured to be capable of changing the call type from a speech mode to another transmission mode during the call, and wherein

the first switching center is configured to send, in response to said change of call type from said speech mode to said other transmission mode, to said at least one second switching center a signaling message commanding said second switching center to disconnect the echo canceling equipment from a call connection, when said call connection is routed via said second switching center.

21. (Amended) A network according to claim 20, wherein said telecommunications network is a mobile communications network, said first switching center is a mobile switching center and said at least one second switching center is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network.

22. (Amended) A network according to claim 20 or 21, wherein said other transmission mode is a facsimile mode or a data transmission mode.

Please see Appendix for changes made to the claims.

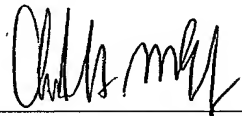
REMARKS

Claims 1-22 are pending in this National Stage application. By this Amendment, these claims are amended to further conform to U.S. practice, *e.g.*, to remove reference numerals and multiple dependencies. No new material is added to the claims.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached Appendix is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

Respectfully submitted,

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Enclosure: Appendix

APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The priority claim is recited.

IN THE CLAIMS:

1. (Amended) A method for controlling echo canceling in a telecommunications network comprising a first switching center having no echo canceling equipment and at least one second switching center having echo canceling equipment, said method comprising a step of establishing a call connection which is routed via said first switching center and said at least one second switching center without connecting the echo canceling equipment to the connection,

~~[characterized by further steps of]~~

changing, under control of said first switching center, a configuration of the call connection so that echo canceling becomes necessary,

sending to said at least one second switching center from said first switching center a message commanding said at least one second switching center to connect the echo canceling equipment to the connection.

2. (Amended) A method according to claim 1, wherein said telecommunications network is a mobile communications network, said first switching center is a mobile switching center, and said at least one second switching center is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network, ~~[characterized by steps of]~~ said method further comprising

establishing said call connection initially between a first fixed telephone network party and a second fixed network party through said first mobile switching center and said gateway mobile switching center without any echo canceling equip-

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ment being connected to the call connection in said gateway mobile switching center,
releasing a connection leg between said first mobile switching center and
the second fixed network party,

establishing, under control of said first mobile switching center, a new
connection leg to a mobile station in the mobile communications network so that an
end-to-end connection between the first fixed telephone network party and the mobile
station is provided through the first and gateway mobile switching centers,

· sending to said gateway mobile switching center from said first mobile
switching center a message commanding said gateway mobile switching center to con-
nect the echo canceling equipment to the connection.

3. (Amended) A method according to claim 1 or 2, [~~character-~~
~~ized by~~] wherein said message being an ISUP Facility message provided with a spe-
cific field for controlling the connecting of the echo canceling equipment.

4. (Amended) A method according to claim 1 or 2, [~~2 or 3, charac-~~
~~terized by a step of~~] comprising controlling the call in said first switching center
by an intelligent network.

5. (Amended) A method according to claim 4, [~~characterized by~~
~~a step~~] comprising of performing said release of the connection leg to the second
fixed network party and said establishment of the new connection to the mobile station
during a call party handling procedure of the intelligent network.

6. (Amended) A method according to claim 2, 3 or 4, [~~character-~~
~~ized by~~] wherein said step of releasing the connection leg between said first mobile
switching center and the second fixed network party being performed in response to a
release initiated by the second fixed network party, preferably a voice mail service.

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7. (Amended) A method for controlling echo canceling in a telecommunications network comprising a first switching center having no echo canceling equipment and at least one second switching center having echo canceling equipment, said method comprising a step of

establishing a call connection in a speech mode via said first switching center and said at least one second switching center so that the echo canceling equipment is connected to the connection,

~~[characterized by further steps of]~~

changing, under control of said first switching center, the type of call connection from the speech mode to another transmission mode in which echo canceling is not allowed,

sending to said at least one second switching center from said first switching center a signaling message commanding said second switching center to disconnect the echo canceling equipment from the connection.

8. (Amended) A method according to claim 7, ~~[characterized by steps of]~~ comprising

changing, under control of said first switching center, the type of the call connection from said other transmission mode back to the speech mode,

sending to said at least one second switching center from said first switching center a signaling message commanding said second switching center to connect the echo canceling equipment to the connection.

9. (Amended) A method according to claim 7 or 8, ~~[characterized in that]~~ wherein said telecommunications network is a mobile communications network, said first switching center is a mobile switching center, and said at least one second switching center is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network.

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10. (Amended) A method according to claim 9, ~~[characterized by steps of]~~ comprising

establishing said call connection between a mobile station and a second fixed network subscriber through said first mobile switching center and said gateway mobile switching center with echo canceling equipment being connected to the call connection in said gateway mobile switching center,

changing, under control of said mobile switching center, the type of call connection from the speech mode to said other transmission mode in which echo canceling is not allowed,

sending to said gateway mobile switching center from said first mobile switching center said signaling message commanding said gateway mobile switching center to disconnect the echo canceling equipment from the connection.

11. (Amended) A method according to claim 9, ~~[characterized by steps of]~~ comprising

changing, under control of said mobile switching center, the type of the connection from said other transmission mode back to the speech mode,

sending to said gateway mobile switching center from said first mobile switching center said signaling message commanding said gateway mobile switching center to connect the echo canceling equipment to the connection.

12. (Amended) A method according to claim 7 or 8 ~~[any one of claims 7-11, characterized in that]~~ wherein said other transmission mode is a facsimile mode or a data transmission mode.

13. (Amended) A communications network, comprising a first switching center ~~[(MSC)]~~ having no echo canceling equipment and at least one second switching center ~~[(PSTN gw MSC)]~~ having echo canceling equipment, said first switching center

[(MSC)] being configured to be capable of changing the call party during the call by releasing a connection leg to an old party and establishing a new connection leg to a new party, [~~characterized by~~] and wherein

the first switching center [(MSC)] is [~~arranged~~] configured to send, in response to the change of call party, to said at least one second switching center-[(PSTN gw-MSC)] a signaling message [(FAC)]-commanding said second switching center to connect the echo canceling equipment to a call connection, when there is no echo canceling equipment already connected to the call connection and echo canceling is required due to the new party.

14. (Amended) A network according to claim 13, [~~characterized in that~~] wherein said communications network is a mobile communications network, said first switching center is a mobile switching center-[(MSC)], and said at least one second switching center [(PSTN gw-MSC)] is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network.

15. (Amended) A network according to claim 14, [~~characterized in that~~]- wherein said call connection initially comprises a first connection leg from the first mobile switching center [(MSC)] via said gateway mobile switching center [(PSTN gw-MSC)] to a first fixed telephone network party, and a second connection leg from the first mobile switching center [(MSC)] to a second fixed telephone network party, and [~~that~~]-wherein the first mobile switching center is [~~arranged~~]-configured to release the second connection leg in response to a release message sent by the second fixed telephone network party, and to establish a new connection leg from the first mobile switching center [(MSC)] to a mobile subscriber-[(MS)], said new connection requiring echo canceling.

16. (Amended) A network according to claim 14, [~~characterized in that~~] wherein said [~~said~~] call connection initially comprises a first connection leg

from the first mobile switching center [(MSC)] via said gateway mobile switching center [(PSTN-gw-MSC)] to a first fixed telephone network party, and a second call connection leg from the first mobile switching center [(MSC)] via said gateway mobile switching center [(PSTN-gw-MSC)] to a service node, preferably a voice mail service, and that the first mobile switching center is ~~[arranged]~~ configured to release the second connection leg in response to a release message sent by the service node, and to establish a new connection leg from the first mobile switching center [(MSC)] to a mobile subscriber-[(MS)], said new connection requiring echo canceling.

17. (Amended) A network according to claim 13 ~~[any one of claims 12-16, characterized by]~~ wherein said message [(FAC) being] is an ISUP Facility message provided with control information for controlling the connecting of the echo canceling equipment.

18. (Amended) A network according to claim 13, ~~[any one of claims 13-17, characterized by]~~ wherein said first switching center [(MSC) being] is connected to a service control point in an intelligent network.

19. (Amended) A network according to claim 18, ~~[characterized by]~~ wherein said first switching center [(MSC) being] is ~~[arranged]~~ configured to perform the change of a call party by a call party handling procedure of the intelligent network.

20. (Amended) A communications network comprising a first switching center [(MSC)] having no echo canceling equipment and at least one second switching center [(PSTN-gw-MSC)] having echo canceling equipment, said first switching center [(MSC)] being configured to be capable of changing the call type from a speech mode to another transmission mode during the call, ~~[characterized by]~~ and wherein

the first switching center ~~(MSC)~~ is ~~[arranged]~~ configured to send, in response to said change of call type from said speech mode to said other transmission mode, to said at least one second switching center a signaling message ~~[(FAC)]~~ commanding said second switching center ~~[(PSTN gw MSC)]~~ to disconnect the echo canceling equipment from a call connection, when said call connection is routed via said second switching center. ~~[8(MSC) (PSTN gw MSC) (MSC) (MSC) (PSTN gw MSC) (FAC)]~~

21. (Amended) A network according to claim 20, ~~[characterized in that]~~ wherein said telecommunications network is a mobile communications network, said first switching center is a mobile switching center ~~[(MSC)]~~, and said at least one second switching center is a gateway mobile switching center ~~[(PSTN gw MSC)]~~ connecting said mobile communications network to a fixed telephone network.

22. (Amended) A network according to claim 20 or 21, ~~[characterized in that]~~ wherein said other transmission mode is a facsimile mode or a data transmission mode.

2/PR-13

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JC19 Rec'd PCT/PTO 06 MAR 2002

Control of echo cancellers in a telecommunications system

Field of the Invention

[0001] The invention relates to echo canceling, and more particularly, to control of echo cancellers in telecommunication systems.

Background of the Invention

[0002] In telecommunications networks transferring speech, such as telephone networks and mobile communications systems, an echo may occur on end-to-end connections, as the voice of the talking party is reflected from the network elements or the connection. The echo is disturbing if there is a significant delay on the end-to-end connection. The delay is usually a propagation delay which causes the echo especially in long-distance or international calls and in calls using satellite links. The delay may also result from digital signal processing which is the main reason for echo in digital mobile communications systems. The echo is divided into two categories: an acoustic echo between the ear piece and the microphone over telephone and an electric echo caused in transmission and reception directions in communications systems. One of the main reasons behind the electric echo is hybrid circuits (two-wire-four-wire converters) located in local exchanges or remote subscribers' stages.

[0003] An echo canceller or an echo suppresser has conventionally been used to obviate problems caused by the echo. An echo canceller is a device for processing a speech signal. It estimates the echo and reduces it by subtracting the echo estimate from a signal returning from the echo path.

[0004] In mobile communications systems, the echo cancellers are typically included in the mobile terminals and mobile switching centers which provide a gateway to other network, such as the public switched telephone network PSTN. The mobile switching center providing a gateway to the PSTN is referred to as a PSTN gateway-MSC herein. In the MS-MS call both the terminals contain the needed echo canceller device and the network elements involved in the call need not have any echo canceller. In the PSTN-MS call another echo canceller must be connected to the PSTN side of the call at the PSTN gateway-MSC while the other echo canceller is in the MS, or otherwise the echo is noticed in the mobile terminal.

[0005] An intelligent network is a flexible way to introduce new services into the telecommunications network. The intelligent network consists of

service control points (SCP), service switching points (SSP) and various other elements. The service switching point's (SSP) functionality is typically located in the switching center of a conventional communications network, such as the MSC or the GMSC in the GSM system. The SSP/MSC is then connected to the service control point (SCP) which contains the intelligent service programs. The call control of the MSC uses a basic call state model (BCSM) which contains various detection points (DP) for modeling the state of the call towards the SCP. One or more of the detection points may be provided with a service trigger for the desired IN service. When call establishment proceeds to the detection point in the BCSM, and there is an activated service trigger, the SSP/MSC sends a request to the SCP. The SCP responds with operations which control the functions of the SSP/MSC in such a way that the activated service can be provided.

[0006] The IN services or similar services (e.g. services initiated by a voice message service or a voice mail system VMS) may include call drop back, call drop back return, follow on call, and call party handling services. The call drop back mechanism allows subscriber A to make a call to the person who has left a message in the voice mail. The call will be "dropped" to some of the previous MSCs and rerouted to subscriber C. In this mechanism subscriber A does not have to release the original call and make a new call to subscriber C. Call drop back return is a re-establishment of the MSC-VMS/service node (VMS = Voice Mail Service) connection, when the connection to the subscriber C has been successful and when the subscriber C has hung up the phone. The call can then be forwarded again to another subscriber. The follow-on call is a feature that enables the user to make a series of service requests without going through the identification and authentication process before performing each requested service. The identification and authentication are performed only on the first service request of the series. This functionality may be enhanced with other capabilities, it may be used e.g. for the call drop back service. One further service is call party handling (CPH). The CPH operations allow to establish new call parties in a flexible manner or to remove parties from the call and control the cross-connections between the parties. All the above-mentioned services may involve change of the connection configuration during the call.

[0007] The echo problem can appear in some particular cases when the connection configuration is changed during the call. This problem arises if the original connection configuration does not reserve any echo canceller, but the new connection configuration would require one. This happens, for example,

when a PSTN-PSTN connection is changed to a PSTN-MS connection. The same problem also concerns private branch exchange (PBX) calls. As an example, let us assume that a call addressed to a mobile station MS is routed from the PSTN via a PSTN gateway mobile switching center (PSTN gw-MSC) to a serving mobile switching center (MSC) within a mobile network. Then, due to an activated call-forwarding-when-busy service, for example, the call is further routed from the serving MSC via the same or another PSTN gw-MSC to the PSTN. In a PSTN-PSTN call no echo canceller is reserved in the PSTN gw-MSC. Then, later during the call, when for instance the CPH is used, the connection configuration is changed by releasing the second (forward) PSTN leg and establishing a new connection leg to the called MS under control of the serving MSC. The new PSTN-MS call would require an echo canceller but the PSTN gw-MSC has not reserved any echo canceller for the call. Therefore, the MS subscriber will experience a disturbing echo. One solution to this problem would be to provide an echo canceller in each MSC so that the serving MSC can internally connect an echo canceller to a call connection while changing the connection configuration.

[0008] Similar problem may arise when the type of call is changed during an active call. For example, a call may be started in a speech mode requiring an echo canceller in the PSTN gw-MSC and then later be changed into a facsimile mode in which the echo canceller is not allowed. Thus, also switching between the speech mode and the fax mode during a call requires an echo canceller in each MSC so that the echo canceller can be connected to and disconnected from the call.

Disclosure of the Invention

[0009] An object of the present invention is to avoid the need for echo canceling equipment in each switching center in a communications network.

[0010] The invention relates to methods and communication networks as claimed in the attached independent claims. Preferred embodiments of the claims are disclosed in the dependent claims.

[0011] The basic idea of the invention is that the switching center which controls the change of the call party or the change of the call type is arranged to command the nearest switching center having the echo canceling capability, to connect/disconnect echo canceling equipment to/from the con-

nection. In other words, in these special situations the echo cancellation is controlled by a new signaling feature within the communications network. As a result, it is unnecessary to introduce echo canceling equipment into each switching center in the communications network for these special situations only.

[0012] The signaling may be performed by any signaling message which can be sent during an active call, e.g. a new signaling message defined for this special purpose, or an existing signaling message modified to carry the echo canceller control information according to the invention. In the preferred embodiment of the invention, an ISUP message, such as the ISUP Facility message, is provided with a new parameter for controlling the echo canceling.

Brief Description of the Drawings

[0013] In the following the invention will be described in great detail by means of the preferred embodiments with reference to the accompanying drawings, in which

[0014] Figure 1 is a block diagram illustrating a PSTN-PSTN call established via a serving SSP/MS in a mobile communications network,

[0015] Figure 2 is a block diagram illustrating a PSTN-MS call changed from the PSTN-MS call of Figure 1 by means of call party handling CPH, for example,

[0016] Figure 3 is a signaling diagram illustrating the signaling used for changing the connection configuration from Figure 1 to Figure 2 and the control of the echo canceller according to the present invention,

[0017] Figure 4 is a block diagram illustrating a speech/fax call between the MS and the PSTN, and

[0018] Figure 5 is a signaling diagram illustrating the change of the call type from speech to fax and vice versa, and the associated control of the echo canceller according to the present invention.

Preferred embodiments of the invention

[0019] The present invention can be applied to any telecommunications system in which the connection configuration or the call type or any other feature of the call is changed during the call so that the need for echo canceling arises or echo canceling cannot be used any more.

[0020] The preferred embodiments of the invention will be described below using the GSM mobile communication network as an example.

[0021] Referring now to Figure 1, the mobile switching center MSC is connected to a service control point of the intelligent network and operates as a service switching point SSP. Although not shown in Figure 1, the MSC/SSP is connected to a base station system BSS which provides a radio connection for the mobile station MS. One or more of the mobile switching centers in the mobile network are gateway MSCs which comprise gateway functions for calls routed to external telecommunications networks and calls arriving from those networks. In Figure 1 there are two PSTN gw-MSCs connected to the PSTN. There are also at least two data bases, the home location register HLR and the visitor location register VLR in the network (not shown).

[0022] Figure 1 shows a PSTN-PSTN call connection configuration. This connection configuration may have resulted for example from a call made by the PSTN subscriber A via the PSTN gw-MSC to the SSP/MSC serving the addressed mobile station MSC (subscriber C). Then, for some reason, for example due to a call-forwarding-when-busy function, the second connection leg is not established from the SSP/MSC to the called MS but the call is routed via a second PSTN gw-MSC to a second PSTN subscriber (subscriber B). As a consequence, we have a connection comprising a first connection leg from the subscriber A to the serving SSP/MSC and a second connection leg from the serving SSP/MSC to the PSTN subscriber B.

[0023] Let us now assume that when the call is active and having a configuration as illustrated in Figure 2, the PSTN subscriber B who has a re-answer possibility initiates release of the call, and an ISUP release message SUS is sent via the PSTN gw-MSC to the SSP/MSC. Based on the follow-on call feature, for instance, the SSP/MSC sends an initial DP message (an INAP operation) in order to initiate a new IN service in the SCP. The SCP responds with a disconnect leg message DL. Disconnect leg is an INAP operation which enables the SCP to disconnect (release) a connection leg in a two-party or multiparty call. Upon receiving the message DL, the SSP/MSC sends an ISUP release-message REL via the PSTN gw-MSC to the PSTN. The terminating side will acknowledge the REL by a message RLC. As a result, the second leg from the SSP/MSC to the PSTN is released. It should be noted that the IN service initiated by the IDP message involves some sort of user interaction before the DL message is sent. For example, an announcement may be

played to the subscriber A in order to prompt him to provide instructions on how the call should be rerouted. The instructions may be given orally or by DTMF (Dual Tone Multi Frequency) dialing. The announcement may be for example: "Push number one for the secretary, number two for the voice mail", etc. It is also possible that the subscriber B, e.g. a voice message service, sends the number of the subscriber C to which the call should be rerouted in the release message REL. In the latter case the MSC can independently reroute the call also when no IN network is involved (cf. The call dropback service).

[0024] After sending the message DL, the SCP sends a connect message CON to the SSP/MSC. Connect is an INAP operation which enables the SCP to provide a telephone number of the new subscriber C to which the call is to be rerouted. The telephone number of the subscriber C may have been obtained from the subscriber A during the user interaction or selected according to the instructions from the subscriber A, or the number may have been obtained by some other method.

[0025] Upon receiving the message CON, the SSP/MSC sends an ISUP facility message FAC to the PSTN gw-MSC on the first leg (i.e. towards the subscriber A). In accordance with the present invention, the message FAC contains control information which causes the PSTN gw-MSC to connect the echo canceling equipment to a line. The SSP/MSC has determined that echo canceling is needed because the new subscriber C is a mobile station MS.

[0026] Prior to, simultaneously with, or after sending the message FAC, the SSP/MSC carries out a normal call setup to the mobile station C. As the call to be setup is a speech call, echo canceling is automatically used in the mobile station MS. Then the subscriber C answers normally and call configuration is completed as shown in Figure 2. The old call configuration is shown by a dashed line in Figure 2.

[0027] The ISUP facility message is defined in ITU-T recommendation Q.763, table 45. The new echo-canceller-control parameter for the purposes of the present invention can be defined to be one of the optional parameters. Other parameters which may be required in the echo canceller control are the message type, message compatibility information, and parameter compatibility information in the facility message. It should be noted, however, that the control information according to the present invention can be

sent using any message which can be sent in a speech state during an active call.

[0028] Another reason for using call configuration according to Figure 1 may be that the subscriber A has called to a service number in a mobile communications network, and the call has resulted in a IN service request to the SCP in a signaling phase, and then the SCP has commanded that the call should be routed to the PSTN subscriber B. In this case, the SSP would likely report the release of the second leg using an event report BCSM (ERB) message instead of an IDP message.

[0029] As noted above, the need for echo canceling may change also when the call type is changed during an active call. The possible call types may include a speech mode, a facsimile mode, and a data transmission mode, for example. In the following, the invention will be illustrated by using a speech/fax call as an example. Figure 4 illustrates a speech/fax call established from a mobile subscriber A via a serving MSC and a PSTN gw-MSC to the PSTN subscriber B. The PSTN gw-MSC is provided with echo canceling equipment which can be connected to the call when needed. The MSC has no echo canceling equipment. Normally, when establishing a speech call, the GSM traffic channel between the mobile station MS and the serving MSC is in a speech mode using speech encoding. The transmission leg between the serving MSC and the PSTN gateway MSC is typically a PCM link, and a typical PSTN connection (or ISDN connection) is provided between the PSTN gw-MSC and the PSTN subscriber B. As the call is established in a speech state, the echo canceling equipment is also needed and connected to the line in the PSTN gateway-MSC. However, upon establishing the call initially in a speech mode, the mobile station may automatically or due to the user intervention, change the call type into a facsimile mode. The facsimile mode means that the traffic channel between the MS and MSC is in a data mode and specific facsimile adapters are provided at the ends of the connection. The echo canceling is not allowed in the facsimile call since the signal is distorted by the echo canceling, and thus the facsimile transmission has deteriorated or failed. Therefore, the echo canceling equipment should be disconnected from the line in the PSTN gw-MSC. On the other hand, if the call were later returned to the speech mode, the echo canceling equipment should be connected back to the line.

[0030] Figure 5 is a signaling diagram illustrating the echo canceller control according to the present invention in a speech/facsimile call. Firstly, the MS changes the call type from the speech to the facsimile mode in the mobile equipment (step 51). The MS initiates the change of the GSM traffic channel from the speech mode to the facsimile mode by signaling to the MSC (step 52). The MSC changes the mode of the traffic channel, and in accordance with the present invention, sends an ISUP facility message FAC containing the echo canceller control information to the PSTN gateway-MSC (step 53). Reacting to the received control information, the PSTN gw-MSC disconnects the echo canceller from the outbound circuit of the connection (step 54). As a result, successful facsimile transmission can be initiated.

[0031] Later in the call the mobile station MS initiates a change back to the speech mode (step 55). The MSC changes the GSM traffic channel from the facsimile mode into the speech mode and, in accordance with the present invention, sends an ISUP facility message FAC containing the echo canceller control information to the PSTN gw-MSC. Reacting to the echo canceller control information, the PSTN gw-MSC connects the echo canceling equipment back to the outbound circuit of the connection (step 57).

[0032] It is also possible to disconnect the echo canceller from the line when facsimile signaling is detected by the echo canceller or the PSTN gw-MSC. However, in this case the echo canceller cannot be connected back to the line when the call is changed back to the speech mode, and thus an echo will be present in the call in the prior art systems. Also, this problem can be avoided by an embodiment of the present invention wherein the serving MSC, when changing the mode of GSM traffic channel, commands the PSTN gw-MSC to connect the echo canceller to the line. This corresponds to steps 55-57 in Fig. 5. However, when changing from a speech mode to a facsimile mode, the echo canceller independently detects the facsimile mode and leaves the connection. In other words, the steps 52-53 of Fig. 5 are not needed in this embodiment.

[0033] The application has been described above by means of the preferred embodiments to illustrate the principles of the invention. The details of the invention may vary within the scope and spirit of the accompanying claims.

Claims

1. A method for controlling echo canceling in a telecommunications network comprising a first switching center having no echo canceling equipment and at least one second switching center having echo canceling equipment, said method comprising a step of

establishing a call connection which is routed via said first switching center and said at least one second switching center without connecting the echo canceling equipment to the connection,

characterized by further steps of

changing, under control of said first switching center, a configuration of the call connection so that echo canceling becomes necessary,

sending to said at least one second switching center from said first switching center a message commanding said at least one second switching center to connect the echo canceling equipment to the connection.

2. A method according to claim 1, wherein said telecommunications network is a mobile communications network, said first switching center is a mobile switching center, and said at least one second switching center is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network, **characterized** by steps of

establishing said call connection initially between a first fixed telephone network party and a second fixed network party through said first mobile switching center and said gateway mobile switching center without any echo canceling equipment being connected to the call connection in said gateway mobile switching center,

releasing a connection leg between said first mobile switching center and the second fixed network party,

establishing, under control of said first mobile switching center, a new connection leg to a mobile station in the mobile communications network so that an end-to-end connection between the first fixed telephone network party and the mobile station is provided through the first and gateway mobile switching centers,

sending to said gateway mobile switching center from said first mobile switching center a message commanding said gateway mobile switching center to connect the echo canceling equipment to the connection.

3. A method according to claim 1 or 2, **characterized** by said message being an ISUP Facility message provided with a specific field for controlling the connecting of the echo canceling equipment.

4. A method according to claim 1, 2 or 3, **characterized** by a step of controlling the call in said first switching center by an intelligent network.

5. A method according to claim 4, **characterized** by a step of performing said release of the connection leg to the second fixed network party and said establishment of the new connection to the mobile station during a call party handling procedure of the intelligent network.

6. A method according to claim 2, 3 or 4, **characterized** by said step of releasing the connection leg between said first mobile switching center and the second fixed network party being performed in response to a release initiated by the second fixed network party, preferably a voice mail service.

7. A method for controlling echo canceling in a telecommunications network comprising a first switching center having no echo canceling equipment and at least one second switching center having echo canceling equipment, said method comprising a step of

establishing a call connection in a speech mode via said first switching center and said at least one second switching center so that the echo canceling equipment is connected to the connection,

characterized by further steps of

changing, under control of said first switching center, the type of call connection from the speech mode to another transmission mode in which echo canceling is not allowed,

sending to said at least one second switching center from said first switching center a signaling message commanding said second switching center to disconnect the echo canceling equipment from the connection.

8. A method according to claim 7, **characterized** by steps of changing, under control of said first switching center, the type of the call connection from said other transmission mode back to the speech mode,

sending to said at least one second switching center from said first switching center a signaling message commanding said second switching

9. A method according to claim 7 or 8, **characterized** in that said telecommunications network is a mobile communications network, said first switching center is a mobile switching center, and said at least one second switching center is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network.

establishing said call connection between a mobile station and a second fixed network subscriber through said first mobile switching center and said gateway mobile switching center with echo canceling equipment being connected to the call connection in said gateway mobile switching center, changing, under control of said mobile switching center, the type of call connection from the speech mode to said other transmission mode in which echo canceling is not allowed,

11. A method according to claim 9, **characterized** by steps of

12. A method according to any one of claims 7-11, **characterized** in that said other transmission mode is a facsimile mode or a data transmission mode.

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to a new party, **characterized** by

the first switching center (MSC) is arranged to send, in response to the change of call party, to said at least one second switching center (PSTN gw-MSC) a signaling message (FAC) commanding said second switching center to connect the echo canceling equipment to a call connection, when there is no echo canceling equipment already connected to the call connection and echo canceling is required due to the new party.

14. A network according to claim 13, **characterized** in that said communications network is a mobile communications network, said first switching center is a mobile switching center (MSC), and said at least one second switching center (PSTN gw-MSC) is a gateway mobile switching center connecting said mobile communications network to a fixed telephone network.

15. A network according to claim 14, **characterized** in that said call connection initially comprises a first connection leg from the first mobile switching center (MSC) via said gateway mobile switching center (PSTN gw-MSC) to a first fixed telephone network party, and a second connection leg from the first mobile switching center (MSC) to a second fixed telephone network party, and that the first mobile switching center is arranged to release the second connection leg in response to a release message sent by the second fixed telephone network party, and to establish a new connection leg from the first mobile switching center (MSC) to a mobile subscriber (MS), said new connection requiring echo canceling.

16. A network according to claim 14, **characterized** in that said said call connection initially comprises a first connection leg from the first mobile switching center (MSC) via said gateway mobile switching center (PSTN gw-MSC) to a first fixed telephone network party, and a second call connection leg from the first mobile switching center (MSC) via said gateway mobile switching center (PSTN gw-MSC) to a service node, preferably a voice mail service, and that the first mobile switching center is arranged to release the second connection leg in response to a release message sent by the service node, and to establish a new connection leg from the first mobile switching center (MSC) to a mobile subscriber (MS), said new connection requiring echo canceling.

17. A network according to any one of claims 12-16, **characterized** in that

terized by said message (FAC) being an ISUP Facility message provided with control information for controlling the connecting of the echo canceling equipment.

18. A network according to any one of claims 13-17, **characterized** by said first switching center (MSC) being connected to a service control point in an intelligent network.

19. A network according to claim 18, **characterized** by said first switching center (MSC) being arranged to perform the change of a call party by a call party handling procedure of the intelligent network.

20. A communications network comprising a first switching center (MSC) having no echo canceling equipment and at least one second switching center (PSTN gw-MSC) having echo canceling equipment, said first switching center (MSC) being capable of changing the call type from a speech mode to another transmission mode during the call, **characterized** by

the first switching center (MSC) is arranged to send, in response to said change of call type from said speech mode to said other transmission mode, to said at least one second switching center a signaling message (FAC) commanding said second switching center (PSTN gw-MSC) to disconnect the echo canceling equipment from a call connection, when said call connection is routed via said second switching center. 8(MSC) (PSTN gw-MSC) (MSC) (MSC) (PSTN gw-MSC) (FAC)

21. A network according to claim 20, **characterized** in that said telecommunications network is a mobile communications network, said first switching center is a mobile switching center (MSC), and said at least one second switching center is a gateway mobile switching center (PSTN gw-MSC) connecting said mobile communications network to a fixed telephone network.

22. A network according to claim 20 or 21, **characterized** in that said other transmission mode is a facsimile mode or a data transmission mode.

Abstract

The invention relates to a communications network, comprising switching centers (SSP/MSC) having no echo canceling equipment and switching centers (PSTN gw-MSC) having echo canceling equipment. The switching centers (SSP/MSC) are capable of changing the call party or the call during the call. The switching center (SSP/MSC) which controls the change of call party or call type is arranged to command (FAC) the nearest switching center (PSTN gw-MSC) having the echo canceling capability to connect/disconnect an echo canceling equipment to/from the connection. In other words, in these special situations the echo cancellation is controlled by a new signaling feature within the communications network. As a result, it is unnecessary to introduce echo canceling equipment into each switching center in the communications network for these special situations only.

(Fig. 3)

Fig. 1

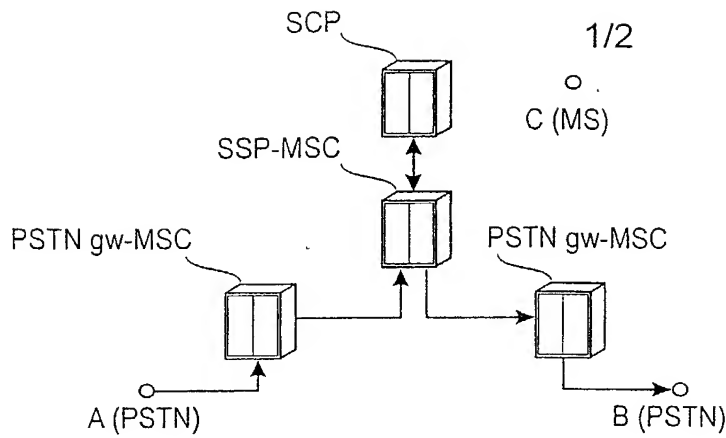


Fig. 2

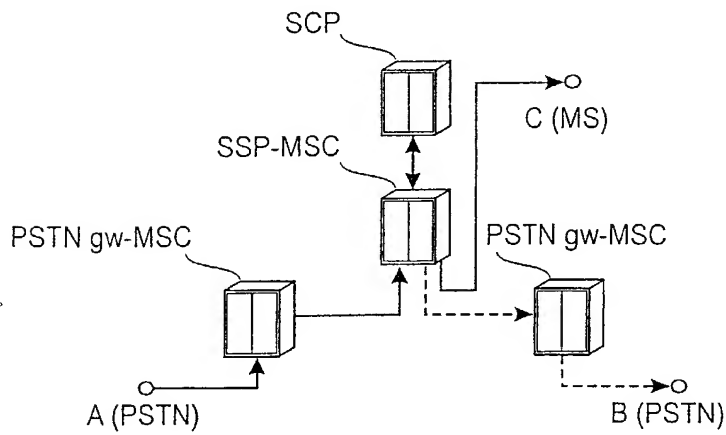


Fig. 3

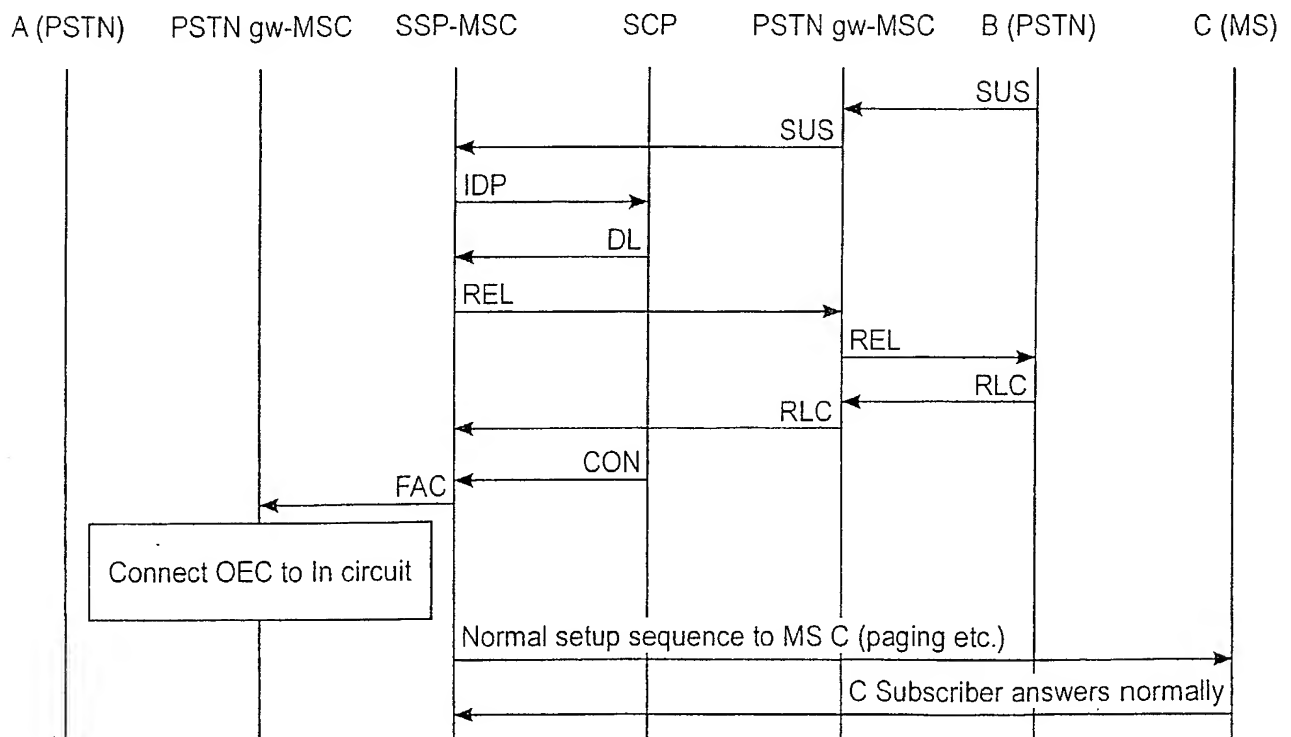


Fig. 4

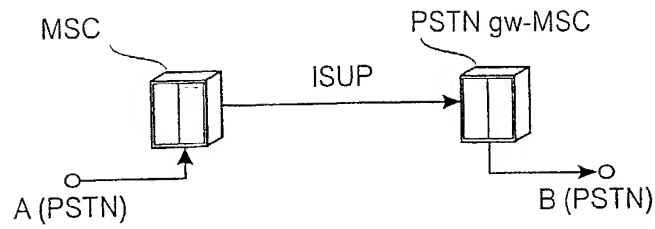
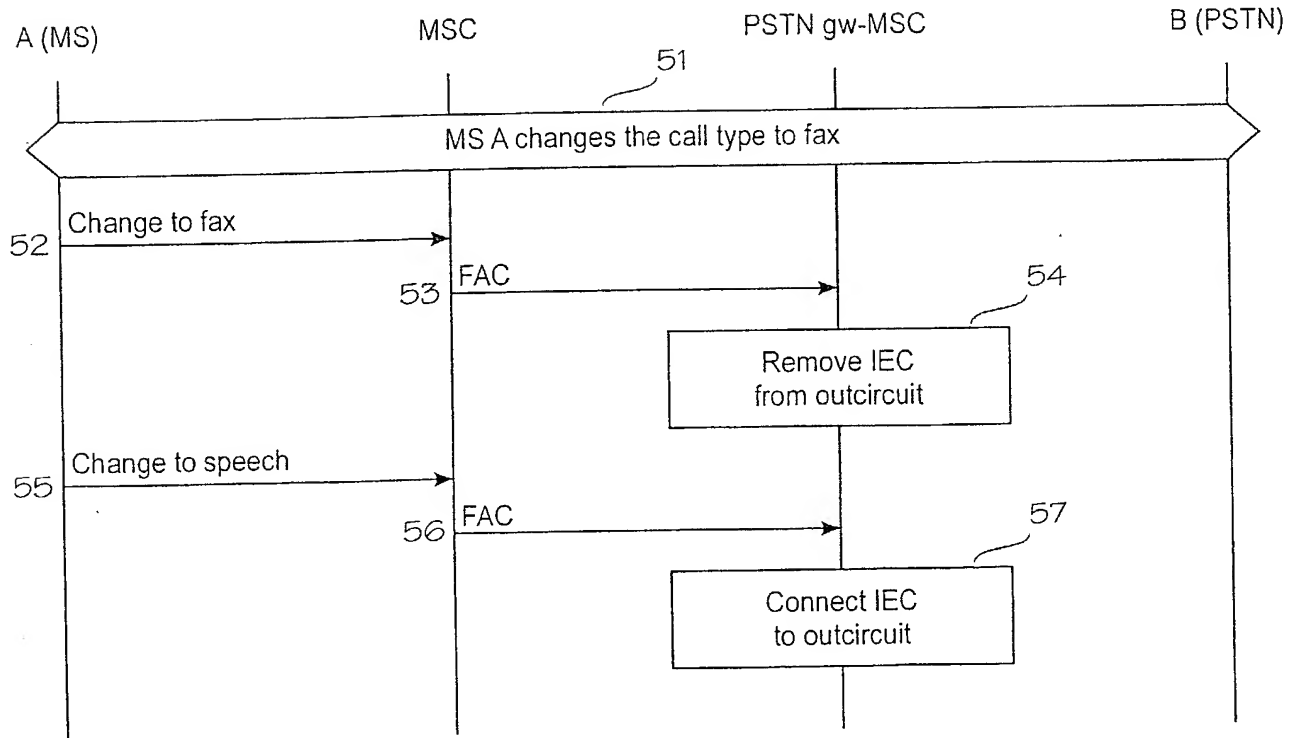


Fig. 5



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DECLARATIONS

RULE 63 (37 C.F.R. 1.63)
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FORM

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the **INVENTION ENTITLED Control of echo cancellers in a telecommunications system**

the specification of which (CHECK applicable BOX(ES).)

X
BOX(ES) → A. ☐ is attached hereto.
→ B. ☐ was filed on _____ as U.S. Application No. _____ /
→ C. ☒ was filed as PCT International Application No. PCT/ F100 / 00815 on 22 September 2000
and (if applicable to U.S. or PCT application) was amended on _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. Except as noted below, I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International Application which designated at least one other country than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT International Application, filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which priority is claimed, or (2) if no priority claimed, before the filing date of this application:

PRIOR FOREIGN APPLICATION(S)	Date first Laid-open or Published	Date Patented or Granted	Priority NOT Claimed
Number 19992054	Country Finland	Day/MONTH/Year Filed 24 September 1999	

If more prior foreign applications, X box at bottom and continue on attached page.

Except as noted below, I hereby claim domestic priority benefit under 35 U.S.C. 119(e) or 120 and/or 365(c) of the indicated United States applications listed below and PCT international applications listed above or below and, if this is a continuation-in-part (CIP) application, insofar as the subject matter disclosed and claimed in this application is in addition to that disclosed in such prior applications, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of each such prior application and the national or PCT international filing date of this application:

PRIOR U.S. PROVISIONAL, NONPROVISIONAL AND/OR PCT APPLICATION(S)	Status	Priority NOT Claimed
Application No. (series code/serial no.) Day/MONTH/Year Filed	pending, abandoned, patented	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint Pillsbury Winthrop LLP, Intellectual Property Group, telephone number (202) 861-3000 (to whom all communications are to be directed), and persons of that firm who are associated with USPTO Customer No. 909 (see below label) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent, and I hereby authorize them to delete from that Customer No. names of persons no longer with their firm, to add new persons of their firm to that Customer No., and to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/ organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct the above firm and/or an attorney of that firm in writing to the contrary.

USE ONLY FOR
PILLSBURY WINTHROP

00909

00909

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(include Zip Code)		

☐ FOR ADDITIONAL INVENTORS see attached page.

☐ See additional foreign priorities on attached page (incorporated herein by reference).

Atty. Dkt. No. P

(M#)